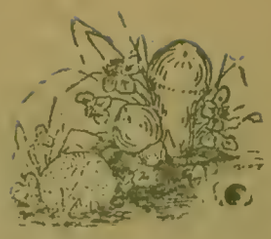
RECEIVED
AUG 11 1904

Gray Herbarium
Harvard Univ.

Nature Study...

Vol. V JUNE No. 1

MANCHESTER, N. H.
NATURE STUDY PRESS
...1904...



NATURE STUDY.

A monthly magazine, published under the auspices of the Manchester Institute of Arts and Sciences. EDITOR: Edward J. Burnham. ASSOCIATE EDITORS: Frederick W. Batchelder, William H. Huse, Susy C. Fogg, Theodora Richardson.

Devoted to the encouragement of the study of Nature in her varied aspects—of the Rocks, the Birds, the Flowers, and all the multitude of living things that crawl or swim, or walk or fly.

Terms: 50 Cents per Annum in Advance.

Advertisements, not to encroach upon reading matter, will be published at a uniform rate of 25 cents an inch for each insertion, without reference to number of insertions or amount of space taken; but no advertisement can be accepted for less than the price of a single inch, one insertion.

Subscribers may insert free, under the head of "Wanted," or "Exchange," any request for information relative to publications desired, minerals or other specimens wanted or for exchange.

Address all matter, whether communications or inquiries, to

NATURE STUDY PRESS, Manchester, N. H.

Entered as Second-Class matter at the Post Office at Manchester, N. H.

THE CONDOR

A Journal of Western Ornithology.

W. K. FISHER, Editor.

J. GRINNELL, F. S. DAGGETT, Associate Editors.

This is a 24 to 32 page illustrated magazine, issued on the fifteenth of each alternate month. It is published as the officia organ of the

Cooper Ornithological Club of California

and reflects the enthusiasm of this energetic bird society.

The CONDOR has just entered its fifth volume, having completed four volumes each an improvement over the one preceding. The prospects for the present year points towards a still further increase in size and general interest.

Subscription, $1.00 per year. Sample Copy, 20 cents

Back volumes and odd numbers can be supplied; also the three numbers of the **Pacific Coast Avifauna** series.

Address all communications to

JOSEPH GRINNELL, Business Manager

PALO ALTO, CAL.

The Birds of New Hampshire

ANNOTATED LIST OF NEW HAMPSHIRE BIRDS

By Glover Morrill Allen

A limited number of copies of this valuable work, prepared for the **Journal of Proceedings of the Manchester Institute of Arts and Sciences,** has been issued in book form.

The volume comprises 204 pages, exclusive of an elaborate index, and contains the original list of New Hampshire Birds compiled by Dr. Belknap more than a century ago, a description of the faunal areas of the state, a carefully written chapter on Migration and a complete Bibliography or reference to literature.

The list itself, includes 283 birds whose presence in the state is absolutely established and reference to many others that have been reported on more or less conclusive authority.

The scientific and common names are given, and each species is copiously annotated from the writer's own personal observation, from much correspondence and from published material gathered from the entire range of bird literature.

Indispensible to everyone who desires to gain a full knowledge of the distribution, habits and relative abundance of New Hampshire Birds and of value to bird lovers everywhere.

PRICE: Paper Covers, $1.00; Cloth, $1.50.

Nature Study Press, Manchester, N. H.

"SUCH GROWTHS ARE SAID TO BE ADVENTITIOUS."

NATURE STUDY.

PUBLISHED UNDER THE AUSPICES OF THE

Manchester Institute of Arts and Sciences.

VOL. V. June, 1904. NO. 1.

An Adventitious Bud.

BY EDWARD J. BURNHAM.

The unusual combination of leaf and cucumber shown in the frontispiece of this month's NATURE STUDY was not a "fake," as many people thought when shown the photograph. The leaf actually grew from the cucumber, as it appears in the picture.

It was not "a made-up thing," as one little girl declared, but rather a sort of recalling of a long-ago time in cucumber history; for the cucumber, like all other plants and flowers and fruits, has passed through many changes, and there was a time, long ago, when it no more resembled the familiar vine that grows in our kitchen and market gardens than the flat, dry lichen on a rock looks like the big, green pumpkin-vine in a farmer's field.

Nature stories differ from fairy stories in being true, but they are quite as wonderful, and many of them may properly begin, as fairy stories used to do, with "Once upon a time." Once upon a time, then, it was with the cucum-

ber-vine, as it was with all other plants, that the stem or vine, the leaves and the blossoms were not distinct and unlike one another, as they are now, but were similar and very simple. The different parts of the plant had not been "developed," as the scientists say.

Nearly all children nowadays are taught something about plant and animal physiology, so that many of those who read NATURE STUDY know that every plant and every animal is built up by and composed of multitudes of minute bodies called cells. These cells are so small that they can be seen only with a powerful microscope, but they are very active and have a great deal to do.

In the beginning, when plants and animals were simple in their structure, these cells all did the same kind of work, but afterwards some of them began to work all the time at making a particular part, as men work at different trades. In animals, some cells make bone, others hair, still others skin, and even particular parts of the skin, and so on and on, through every part of the body. In plants, some make bark, others wood or pith, and others buds. Some cells make the buds that grow to be branches; others make leaf buds, and others the buds that grow to be flowers and fruit.

As these different sets or groups of cells all work in harmony, they build up a plant that is quite regular in a general way, with the many different parts arranged on the same plan in all the plants of the same kind. But the busy little cells have many outside things to contend with. Something is almost always happening to change their work or spoil it altogether. Perhaps, too, they have not thoroughly learned their trades, after all the thousands of years they have been working at them. So no two plants, or blossoms, or fruits are ever exactly alike.

At a first glance, any cucumber-vine looks much like any other. Its leaves grow from opposite sides of the

vine, but the leaves themselves are not opposite to each other, their arrangement being termed "alternate" by the botanists to distinguish this kind of plants from those whose leaves are placed "opposite," or in pairs. The blossoms are all "five-parted," as the botanical term is, and any boy or girl can pull a cucumber blossom to pieces and quite easily find the five petals or "blossom leaves," perhaps a little grown together. The fruit is always nearly enough the same so that any one can recognize a cucumber.

But a more careful examination will show that no two leaves are alike, that they are not always placed at equal distances apart, that the blossoms vary in place and number and size, and that the cucumbers differ so greatly among themselves that no two precisely alike can be found in the whole world. In fact, almost the only thing that is always certain about the cucumber plant is that its blossoms are never blue, and, so far as we now know, never can be.

These differences show that the cucumber plant, like all other plants and animals, is constantly changing—very little, to be sure, in a year or in a hundred years, but changing, nevertheless, as it has done from the time when it first began, and as it will do, probably, so long as cucumbers grow.

In the midst of so much change and so many variations, it is not strange that sometimes a cell or group of cells gets mixed up with the others and out of place, or forgets what it was expected to make and goes to making something else. When this happens, buds may start to grow in the most unexpected places, as in the case of the bud which grew to be a leaf on the side of a cucumber. Such growths are said to be adventitious—that is, they are accidental, so far as any one can tell. Perhaps, if we knew more about the cause, we should understand that there is nothing accidental in it at all.

But we do know that an adventitious bud may begin to grow and expand into a leaf or a blossom almost anywhere on a plant—sometimes even on the roots. Apples have been found with leaves growing from them, as the leaf grew from the cucumber. Such cases are not often observed, but the reason probably is that few people have yet learned to make full use of their eyes. There is no doubt that adventitious buds are much more common than is generally thought—that the busy little bud-making cells frequently get misplaced or mixed up, or become confused in their work, or fall back to the ways of their ancestors thousands of years ago, before so many changes had come about in the world.

The Camel's Stride.

BY O. H. LEAVITT.

What most attracts your attention when you see the camel in a show parade passing along the street?

It is probably the ungainly hump on his back, and the swaying motion which gives the rider twice the worth of his money by carrying him twice as far as he would travel by riding a horse the same distance.

Possibly it is the head, with the patient, mild eyes, indicating that the animal knows no better than to go where he is directed.

But, the next time you have the opportunity, get a view of the camel when he is approaching at some distance, and watch the motions of his feet and legs—the steady, measured stride, and the firm planting of each foot at every step.

Then it will take but little imagination to call up the journey across the burning sands; the commerce of a vast country that could never have reached an outlet by any

other means; the encampment in the desert; the wild Arabs, following their ancient and inherited customs, with the camel the central figure and the only means of transportation, his nose buried in the sand to escape the stifling simoon while it passes, and the patience with which he submits to the burden when it is again lashed on his ungainly back.

Take this view of the camel, and you will be well repaid for waiting for the parade.

A Fuel Supply.

In the Carolinas and Georgia it is cotton that is the staple; in Florida the crops that pay vary in different regions. The citrous fruits—oranges, lemons, grape-fruit, and limes—have yielded from $4,000,000 to $5,000,000 this season; pine-apples, $2,500,000; tomatoes, $3,000,000; and potatoes, beans, egg-plants, and peppers about an equal amount. Nearly all these fruits and vegetables are eaten by people who pay "fancy" prices for them, since they are luxuries, while fuel is a necessity which even the very poor can not do without. The laws of supply and demand are such that the railroads make special rates and provide special facilities for the transportation of these luxuries, whereas wood, either as lumber or as fuel, can not be sent by rail, the prices are so excessive, but must be shipped as "ballast" for vessels. Some is used locally, being made into crates and baskets for vegetables, but no one yet has realized the immense possibilities of these southern forests as affording fuel for the Northern States. An old mill-man has suggested that if the sawdust from the sawmills were to be combined with the waste from the turpentine stills and made into fuel-bricks a superior kindling could thus be manufactured at exceedingly low rates. At the time of the coal strikes during the winter of 1902–1903 this suggestion was also made in the *New York Herald*, and several countries abroad were mentioned in which such fuel-bricks were in use. It is stated that the wood of the Florida pine (*Pinus Elliottii*) warps soon after being cut into lumber, but makes excellent fuel, as it becomes fat with resin when dry.—*From The Plant World.*

The English Sparrow.

Mr. C. William Beebe, Curator of Ornithology for the New York Zoological Society, in a recent interview in the *New York Tribune*, had the following to say of the much-discussed English sparrow:

A great many people say they love nature, but have little time to go into the country, and so have to depend on books for most of their information concerning birds and flowers and other forms of life. There is no reason, however, why any one should not begin to cultivate his powers of observation even in the heart of a great city. Let us take the sparrow, for example, and see how much we can learn in a few minutes. Most of us probably know the difference between the male and female English sparrows, but I will venture to say that not one in ten persons could give a satisfactory description of the colors of either. This is a good example of how much we look and how little we really see.

Little can be said in favor of the English sparrows' characteristics of disposition, but let us not blame them for their unfortunate increase in numbers. Man brought them from England, where they are kept in check by nature's wise laws. He deliberately introduced these birds where nature was not prepared for them, with the result that our native birds and the tempers of our citizens suffer. If we can learn anything from watching these "rats of the air," as they have been called, let us improve the opportunity.

When we put aside prejudice we can see that the male bird, especially when in his bright spring colors, is really very attractive, with his ashy gray head, his back streaked with black and bay, the white bar on his wings and the chin and throat jet black, contrasting strongly with the uniformly light colored hinder parts. If this was a rare bird the

"black-throated sparrow" would enjoy unlimited admiration.

It is wonderful how he can adapt himself to new conditions, nesting anywhere and everywhere, and this very adaptation is a sign of a high order of intelligence. He has, however, many characteristics which tell us of his former life and surroundings, and the noticing of these will give our vacations much more value and enjoyment as we apply the facts to our native birds of the woods and waters. A few of the habits of this sparrow may mislead us. His thick, conical bill is made for crushing seeds, but now he feeds on so many different substances that its original use, which is shown by its shape, is obscured. If there was such a thing as vaudeville among birds the common sparrow would be a star imitator. He clings to the bark of trees and picks out grubs, supporting himself with his tail like a woodpecker; he launches out into the air, taking insects on the wing like a flycatcher; he clings like a chickadee to the underside of twigs, or hovers in front of a heap of insect eggs, presenting a rather feeble imitation of a hummingbird. These modes of feeding represent many different families of birds.

Although his straw and feather nests are shapeless affairs, and he often feeds on garbage, all æsthetic feeling is not lost, as we can plainly see when he swells out his black neck and white cravat, spreads wings and tail, and beseeches his lady love to admire him. Thus he woos her as long as he is alone, but when several other eager suitors arrive his patience gives out, and the courting turns into a football game. Rough and tumble is the word, and somehow in the midst of it all her highness manages to make her mind known, and off she flies with the lucky one. Thus we have represented the two extremes of courting among birds.

It is worth noting that the male alone is ornamented,

while the colors of the female are much plainer. This dates from a time when it was necessary for the female to be concealed while sitting on the eggs. The young of both sexes are colored like their mother, the young male birds not acquiring the black gorget until perfectly able to take care of themselves.

There are some interesting facts connected with the roosting habits of the English sparrow. In a certain section of the city there remains a solitary tree from the forest which once covered all this "pavemented" land. To this, all winter long, the sparrows begin to flock about four or five o'clock in the afternoon. They come singly and in twos and threes, until the bare limbs are black with them and there seems not room for another bird; but still more keep coming until dark, each new arrival diving into the mass of birds, causing a local commotion. By seven o'clock there are thousands of English Sparrows perched in this one tree. At daylight they are off, whirring away by scores, and in a few minutes the tree is empty and silent. Mutual warmth is thus gained.

Nature is trying her best to regain the balance, and to do this the sparrow must be brought face to face with as many dangers as our wild birds, and, although owing to the bird's fearlessness of man this may never happen, yet at least all the color protection and other former safeguards are slowly but surely being eliminated. On almost every street we may see albino or partly albino birds, as those with white tails or wings. White birds exist in a wild state only from an adaptation to their surroundings. A bird which is white simply because its need of protection has temporarily ceased would become the prey of the first stray hawk which crossed its path, and if any enemy learned to dare to follow it into its haunts the species would become depleted in numbers in a short time. We cannot hope to exterminate the English sparrow even by the most

systematic slaughter, but if some species of small hawk or butcher bird could ever become as fearless an inhabitant of our cities as these birds, their reduction to reasonable numbers would only be a matter of a few months.

The Story of Pike.

BY UNCLE NED.

CHAPTER IV.

Pike grew fast all that summer, for he had a plenty to eat and a great appetite. After a little he did not eat so many insects as at first, although he frequently saw them swimming in the water or crawling about on the bottom. They were small, generally covered with a hard coat, and on the whole scarcely worth while for a pickerel to bother with. Pike found that it was better to let the minnows eat the insects, while he in turn caught and ate the minnows.

The minnows grew quite fast, but Pike grew faster, and by the beginning of autumn he was fully six inches long, and able to eat any fish that was not more than half his size. He passed the greater part of his time lying very still at the edge of a patch of pickerel weed that grew near the shore at the mouth of the brook. It was an easy way to catch small fish, which often came close to him, ready so be snapped up. At the same time he was safe from the larger fish, such as bass and perch and pickerel, big enough to eat him, but which generally stayed in the deeper water of the lake.

There was always something or other, as long as he lived, that Pike had reason to be afraid of; but as he grew larger, the number of creatures that could hurt him became smaller. Of course, even before he was six inches long, or near it, no water-bug could spear him and carry

him away, and no dragon-fly nymph could catch him in its queer trap. No fish could eat him unless bigger than he was, and few that were big enough came up his way. So in course of time he began to take short excursions, darting quickly from one patch of pickerel weed to another—sometimes up the brook, and sometimes a little way along the shore of the lake.

On his trips up stream he sometimes saw members of a muskrat family that had a home in a hole under a bank. The old muskrats had belonged to other families that lived through the previous winter in large haystack-like houses in a bog or marsh farther up the brook; but late in spring, when the freshet was over, they had dug this hole and made a nest for themselves and their young at the farther end of it. The entrance to this hole was under water at the bottom of the brook, and was hidden by a mass of twigs, leaves and dead grass which the muskrats had spread over it. The hole rose under the bank, so that the nest at the end was high above the water and quite dry—at any rate, dry enough for muskrats.

Pike often saw one of the old muskrats come swimming down the brook, his nose just at the top of the water. When it was near the brown pile of twigs and grass, it would dive into the midst of it, making a great stir and roiling the water for some distance round. When the water cleared, the muskrat was nowhere to be seen.

It looked to Pike as if the muskrat had hid in the pile of rubbish at the bottom of the brook; and that was what the little boy thought when he and the little girl came one day with an alder pole, a piece of string and a bent pin to fish for minnows. The muskrat came swimming down in a great hurry, with a big piece of cow-lily root in its mouth, and suddenly disappeared.

"He has hid in that old pile of stuff," said the boy. "See me drive him out!"

He made a great stir with his pole, but no muskrat came, and the girl laughed at him. The boy was almost always telling her to see him do something, and she was almost always laughing at him. She had a pretty way of laughing, which he remembered a great many years afterward.

Whenever Pike went along by the shore of the lake, he always saw a great number of fresh-water mussels, or clams. These clams live half-buried in the sand, standing nearly upright, and with a big, soft, fleshy foot underneath, by means of which they push themselves along. They move very slowly, so slowly that one cannot see that they move at all; and yet in still water the line or furrow which they make in the sand is frequently four or five feet long.

Late one afternoon in fall, as Pike was resting by the lake shore after taking a little journey and eating a bigger minnow than usual, he saw two muskrats busily at work digging the clams from the sand and carrying them one by one to an open, grassy spot on the bank. They made a large pile of clams without stopping to taste of one of them, although muskrats are very fond of clams and are skillful at opening them by biting through the hinge at the back with their sharp teeth.

Of course Pike could not see what happened in the dark, but as he lay close to the shore that night he knew by the waves and splashes around him that a great many muskrats were coming that way and climbing up the bank. The truth is, although Pike did not know it, that the big muskrats and the little muskrats from all that part of the lake, and from up the brook, had come to share in a clam supper.

They gathered in a circle round the pile of clams and ate without any noise or greedy quarreling. Even the little muskrats kept very quiet and behaved properly. Ev-

ery now and then an old one would rise up and look carefully around, for there might be a fox or a dog about. In the old days, when muskrats first learned to eat in this way, there might have been a wildcat or a panther about, and that would have been still more dreadful. Being in an open space and in a circle, the muskrats could see all round them, and if an enemy came near, a warning signal would send them all scurrying down the bank into the water.

When the last clam had been opened and eaten, and the little muskrats had licked their paws and played together, rolling over and over on the grass, the party broke up and all swam away to their homes.

Next day Pike heard the little girl say:

"Oh! what a big pile of shells! How did they get here?"

The little boy, as if it explained it all, answered:

"Huh! They are nothing but clam-shells. There are lots of such piles all round the lake. See me skip one."

He took a shell and threw it with all his strength, but it turned edgewise as it struck the water and sank without skipping at all. As Pike glided into the pickerel weed closer to the bank, he heard the little girl laugh again.

From the littleness, and meanness, and niggardliness forced upon us by circumstances, what a relief to turn aside to the exceeding plenty of Nature! There are no bounds to it, there is no comparison to parallel it, so great is this generosity. No physical reason exists why every human being should not have sufficient, at least, of necessities. For any human being to starve, or even to be in trouble about the procuring of simple food, appears, indeed, a strange and unaccountable thing, quite upside down, and contrary to sense, if you do but consider a moment the enormous profusion the earth throws at our feet.—*Richard Jefferies, in The Life of the Fields.*

The Bear Man.

Many of the tribes of North American Indians have folklore tales and wonder stories which enforce the truth that character is influenced by companionship and association. Thus, in a Navajo legend the hero is warned by a good spirit against eating with some newly found friends:

"Eat not the food of the rats in the home of the rats, if you would not become a rat."

The Cherokee have a wonder story which has been told to many generations of their children, always with the obvious moral that one's associations have a great deal to do with shaping one's character. Mr. James Mooney, whose account of the Cherokee Indians was published in the nineteenth annual report of the Bureau of American Ethnology, has given us this Indian nature story in much the way in which the Indians are accustomed to tell it.

A man went hunting in the mountains and came across a black bear, which he wounded with an arrow. The bear turned and started to run the other way, and the hunter followed, shooting one arrow after another into it without bringing it down. Now, this was a medicine bear, and could talk or read the thoughts of people without their saying a word. At last he stopped, pulled the arrows out of his side and gave them to the man, saying, "It is of no use for you to shoot at me, for you can not kill me. Come to my house and let us live together." The hunter thought to himself, "He may kill me;" but the bear read his thoughts and said, "No, I won't hurt you." The man thought again, "How can I get anything to eat?" but the bear knew his thoughts, and said, "There shall be plenty."

So the hunter went with the bear.

They went on together until they came to a hole in the side of the mountain, and the bear said, "This is not

where I live, but there is going to be a council here and we will see what they do." They went in, and the hole widened as they went, until they came to a large cave like a townhouse. It was full of bears—old bears, young bears, and cubs, white bears, black bears, and brown bears—and a large white bear was the chief. They sat down in a corner, but soon the bears scented the hunter and began to ask, "What is it that smells bad?" The chief said, "Don't talk so; it is only a stranger come to see us. Let him alone." Food was getting scarce in the mountains, and the council was to decide what to do about it. They had sent messengers all over, and while they were talking two bears came in and reported that they had found a country in the low grounds where there were so many chestnuts and acorns that mast was knee deep.

Then they were all pleased, and got ready for a dance, and the dance leader was the one the Indians call Kalasgunahita, "Long Hams," a great black bear that is always lean. After the dance the bears noticed the hunter's bows and arrows, and one said, "This is what men use to kill us. Let us see if we can manage them, and may be we can fight man with his own weapons." So they took the bow and arrows from the hunter to try them. They fitted the arrow and drew back the string, but when they let go it caught in their long claws and the arrows dropped to the ground. They saw that they could not use the bows and arrows and gave them back to the man. When the dance and the council were over, they began to go home, excepting the White Bear chief, who lived there, and at last the hunter and the bear went out together.

They went on until they came to another hole in the side of the mountain, when the bear said, "This is where I live," and they went in. By this time the hunter was very hungry and was wondering how he could get something to eat. The other knew his thoughts, and sitting

up on his hind legs he rubbed his stomach with his fore-paws—*so*—and at once he had both paws full of chestnuts and gave them to the man. He rubbed his stomach again—*so*—and had his paws full of huckleberries, and gave them to the man. He rubbed again—*so*—and gave the man both paws full of blackberries. He rubbed again—*so*—and had his paws full of acorns, but the man said that he could not eat them, and that he had enough already.

The hunter lived in the cave with the bear all winter, until long hair like that of a bear began to grow all over his body and he began to act like a bear; but he still walked like a man. One day in early spring the bear said to him, "Your people down in the settlement are getting ready for a grand hunt in these mountains, and they will come to this cave and kill me and take these clothes from me"—he meant his skin—"but they will not hurt you and will take you home with them." The bear knew what the people were doing down in the settlement just as he always knew what the man was thinking about. Some days passed and the bear said again. "This is the day when the Topknots will come to kill me, but the Split-noses will come first and find us. When they have killed me they will drag me outside the cave and take off my clothes and cut me in pieces. You must cover the blood with leaves, and when they are taking you away look back after you have gone a piece and you will see something."

Soon they heard the hunters coming up the mountain, and then the dogs found the cave and began to bark. The hunters came and looked inside and saw the bear and killed him with their arrows. Then they dragged him outside the cave and skinned the body and cut it in quarters to carry home. The dogs kept on barking until the hunters thought there must be another bear in the cave. They looked in again and saw the man away at the far-

ther end. At first they thought it was another bear on account of his long hair, but they soon saw it was the hunter who had been lost the year before, so they went in and brought him out. Then each hunter took a load of the bear meat and they started home again, bringing the man and the skin with them. Before they left the man piled leaves over the spot where they had cut up the bear, and when they had gone a little way he looked behind and saw the bear rise up out of the leaves, shake himself, and go back into the woods.

When they came near the settlement the man told the hunters that he must be shut up where no one could see him, without anything to eat or drink for seven days and seven nights, until the bear nature had left him and he became like a man again. So they shut him up alone in a house and tried to keep very still about it, but the news got out and his wife heard of it. She came for her husband, but the people would not let her near him; but she came every day and begged so hard that at last after four or five days they let her have him. She took him home with her, but in a short time he died, because he still had a bear's nature and could not live like a man. If they had kept him shut up and fasting until the end of the seven days he would have become a man again and would have lived.

The desert mountains gathered in clusters along the waste, how old and wrinkled, how set and determined they look! Somehow they remind you of a clenched hand with the knuckles turned skyward. They have strength and bulk, the suggestion of quiescent force. Barren rock and nothing more; but what could better epitomize power! The heave of the enormous ridge, the loom of the domed top, the bulk and body of the whole are colossal. Rising as they do from flat sands they give the impression of things deep-based—veritable islands of porphyry bent upward from a yellow sea.—*John C. Van Dyke, in The Desert.*

Nature Study Lessons. XXV.

BY EDWARD J. BURNHAM.

In Nature Study Lessons, during the past two years, we have considered the members of the insect world in several different aspects. At first we took up a few individuals here and there, as we found them, without reference to their place in any system of classification. Next, we began to arrange all the insects which we could find into groups or orders, in accordance with some striking characteristics in the plan of their structure—such as biting or sucking mouthparts, one or two pairs of wings, similar or dissimilar wings, etc.

We have found that insects in our collection could be placed in some one of seven orders, and that each of these orders had been given a name suggested by some striking characteristic of the wings. The insects in one order have hard, horny wing-covers, with a pair of wings folded underneath; in another the wing-covers are half hard and half membranous; in another, covered with minute scales that look and feel like dust; in another there are many veins, and in another very few; in still another the veins are straight, or nearly so, and in one the insects have but a single pair of wings.

It is to be hoped that many readers of NATURE STUDY have fixed the names of these seven orders in their minds so thoroughly by use and habit that they will never be forgotten. Everybody has something to do with insects, whether willing or not, and it is much more convenient, as well as more sensible and intelligent, to speak of them correctly than to call them all bugs or flies indiscriminately.

When we had arranged our insects in seven groups or orders, and learned the name of each and some character-

istic peculiar to it alone, we next took one order by itself and found that we could separate the insects in it into smaller groups, having a sort of family appearance, and these smaller groups we called families.

If we went still farther with our arranging, or classifying, we should find that each family might be again divided into still smaller groups, each of which is called a genus, and that the genus still again is made up of the smallest groups of all, or the species. It is the same with plants. The squashes, for example, all belong to one genus, but there are many species of squashes, as the Hubbard, the Summer, the Crook-necked, and so on.

We shall take up the plants, by the way, in the Nature Study Lessons that are to follow, and try to learn something about classifying them, as we have done with the insects. The world of nature is so large, there are so many things of interest to be seen in our walks and even about our homes—insects, flowers, birds, four-footed creatures, and countless queer things that crawl on the land or swim in the water—that most of us had better learn a little about each kind than try to learn everything about any single group—which, indeed, it would be impossible to do in a lifetime.

We have already learned something about the chief families of the Coleoptera, the Lepidoptera, the Hemiptera, the Orthoptera, the Diptera and the Hymenoptera. All other insects may be arranged in a single remaining order—the Neuroptera or "nerve-winged."

No doubt those entomologists are right who maintain that the insects which have been included in the Neuroptera are so unlike that they ought to be separated into at least a dozen distinct orders. But differences which are significant to the scientist may not be of great importance to other people. Most boys and girls can make a better use of their time than in trying to determine in which cor-

ner of a box to place a May-fly, a Dragon-fly and an Ant-lion.

Taking all the "nerve-wings" as Neuroptera, then, one may soon have a very considerable collection representing that order. There will be the Hellgrammites, the large, harmless, but fierce-looking insects that fly near streams for a few nights about the last of June, and often frighten those who know nothing about them. These can be labeled Sialidæ.

A beautiful insect of the order Neuroptera is the Lace-winged-fly or Golden-eye. It is a dainty little creature, with green wings, a body of a paler shade of green, slender, brown antennæ and a pair of bright, yellow eyes. Chrysopa is a Greek word meaning golden-eye, and this insect may be pinned by itself and labeled with the family name Chrysopidæ.

There is an insect to be found all over the United States which, when young, lives in a little pit hollowed in fine sand, in such sheltered places as old horse-sheds, under over-hanging cliffs and river banks. It is the Ant-lion, known of all children by the picture-books, and yet rarely seen by them in nature, because so few people know where to look for them. The Ant-lion, when grown, emerges as a fine, large insect, with its four nerve-veined wings all alike, and with a long, slender body somewhat like that of a Dragon-fly. If this is captured some summer evening, it will be a prize, and must be proudly labeled with the long family name Myrmeleonidæ.

The May-flies, the Caddis-flies, the Stone-flies, the Dragon-flies and the Scorpion-flies are all interesting insects, but their arrangement into family groups is not an easy matter for any but advanced students. So the boys and girls, at first anyway, had best be content to place them in the collection with just their common English names.

Now, in the next few Nature Study Lessons we will try to learn something about the flowers, at the same time keeping our interest in the insects that love to hover round them.

Maternal Love.

Every one is familiar with the plaintive cries uttered by some species of birds when their nests are disturbed or their young endangered. It indicates no small degree of parental solicitude on the part of the little creatures which has rightly been made much of by many writers on bird topics.

But if those birds which merely fly helplessly about and clamor piteously are to be praised for their affectionate anxiety for their young, what shall be said of a bird which deliberately and silently meets death rather than desert its offspring?

A writer in *Nature Notes*, the admirable nature magazine published in London, England, by the Selborne Society, relates that last spring at Yelvertoft a gorse patch was fired with the purpose of destroying the prickly shrub which is so abundant in some parts of England. After the fire a hen blackbird was found dead with the feathers burned off her back. She had built her nest and hatched her young in one of the shrubs, and she died on the nest rather than abandon the helpless little birds to the flames.

At first thought, the sacrifice seems to have been in vain, but it may not have been so. If the male parent bird survived, he might very likely return to the task of feeding the young after the death of their mother. It would be interesting to know if this were the case, but it does not appear that any further observation was made after the tragedy of the mother's death was discovered.

DO YOU

Want to know everything possible about anything?

Want to obtain early advantage of a trade situation?

Want to compile a scrap-book on a special subject, scientific, dramatic, biographic, political, social, financial, commercial, historic, economic, or otherwise?

Want to prepare a response to a toast; speech in a debating club or elsewhere; paper or essay in a literary club, or anything of that nature?

Want to know anything that is said of you, or anyone else, in print or pictures?

Want to keep yourself up-to-date in anything?

The easiest, surest, quickest, most economical and perfect way is to secure the services of

The United States...
Press Clipping Bureau

153 LA SALLE STREET, CHICAGO.

Send for our Booklet.

Wildflowers and Ferns.

If you are not a subscriber to **THE AMERICAN BOTANIST** you are missing half the enjoyment to be got out of plant study. In the five volumes that have been published, more than 500 articles and notes have appeared and not a technical one among them. Every phase of botany is touched upon. You are sure to find something to interest you in each number. The back numbers are therefore the very best of reading. A full set will always be of value to you.

SUBSCRIPTIONS $1.00 A YEAR.

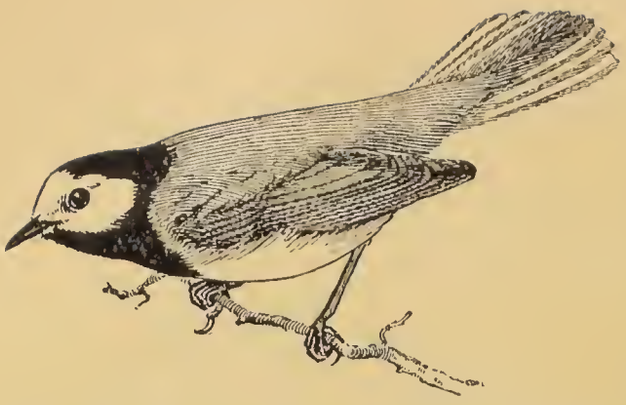
Send 2 cent stamp for samples and special price of back numbers.

THE FERN BULLETIN begins its 12th year in all respects up to its usual excellent standard. If interested in ferns, ask for a sample copy.

SUBSCRIPTIONS 75c A YEAR.

WILLARD N. CLUTE & CO., Publishers,

BINGHAMTON, N. Y.



The Warblers in Color

BIRD-LORE

(Edited by Frank M. Chapman) is publishing a series of colored plates, from drawings by Louis Agassiz Fuertes and Bruce Horsfall, accurately representing all the plumages of North American Warblers.

The text accompanying these beautiful pictures is compiled by Prof. W. W. Cooke, from records in the Biological Survey. It gives the average migration dates of Warblers at hundreds of localities, often for long periods of time. The data for the Redstart, for example, represent the work of over 50 observers for a total of 427 years!

☞ *Until the supply is exhausted we will give a free copy of our December, 1903, issue, containing the first two colored Warbler plates, to all subscribers to Vol. VI of* ***BIRD-LORE****, beginning February 1, 1904.*

20 CENTS A NUMBER $1.00 A YEAR

THE MACMILLAN CO., 66 Fifth Ave., New York City

THE MINERAL COLLECTOR.

PUBLISHED MONTHLY. $1 A YEAR.

The only magazine in the country devoted entirely to Mineralogy. Now in its seventh year. Send 10 cents in stamps for sample copy. Exchange page free to Subscribers.

The Mineral Collector, 173 W. 65th St., New York City

(If you wish a few showy minerals for ornamental purposes or your collection write us.)

Mineral Calcareous Tufa

Showing the organic inclusions interestingly. Specimens suitable for collections. Prefer miscellaneous documentary or scientific publications in exchange. Prompt response to all communications.

JOSEPH N. PROKES, Box 352, Jackson, Minnesota

P. B. WHELPLEY

Biological Draughtsman

DUBLIN ✦ New Hampshire

50 YEARS' EXPERIENCE

PATENTS

TRADE MARKS
DESIGNS
COPYRIGHTS &C.

Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents.

Patents taken through Munn & Co. receive *special notice*, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, $3 a year; four months, $1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, **New York**
Branch Office, 625 F St., Washington, D. C.

OUT OF THE HEART.

I've hunted high and I've hunted low
For a plant magazine that isn't slow.
But now **THE PLANT WORLD'S** come my way
I haven't a word but praise to say.
It's type is clear, its photographs fine,
There's something to learn in every line,
And knowing what popular science can be
I'll say every time: "**THE PLANT WORLD** for me."

You'll say the same thing when you've seen a sample copy. You can get one for a two-cent stamp, or you can have the magazine sent to your address for a year for $1.50. It's worth it. Volume VII has just begun. Address

The Plant World Company,

P. O. BOX 334. WASHINGTON, D. C.

THE KNY-SCHEERER CO.

Department of Natural Science,

DR. G. LAGAI.

NEW YORK, U. S. A. 225-233 Fourth Ave.

ENTOMOLOGICAL SPECIMENS.

School Collections, Metamorphoses,
Biological Models, Wall Charts,
Lantern Slides.
Write for Special Quotations.

ENTOMOLOGICAL SUPPLIES.

Boxes, Cases, Cabinets,
Forceps, Pins, Nets,
Dissecting Instruments,
Museum Supplies.

Rare Insects Bought and Sold.

New Illustrated Catalogue on Application.

American Entomological Co.

1040 DeKalb Ave., Brooklyn, N. Y.,

Price List of Lepidoptera, Caleoptera and Illustrated Catalogue of Entomological Supplies.

No. 4. DEC. 1, 1902. PRICE 5 CTS.

New Features Added Constantly.

Manufacturers of the Genuine and Original Schmitt Insect Boxes. Builders of Cases and Cabinets.

Correct Work Guaranteed.